COASTAL FLOODING RULES OF THUMB

We will take a trip around the compass counter-clockwise starting with an east to northeast wind.

Northeasters with a prolonged period of strong east to northeast winds produce our greatest threat of coastal flooding, especially when they occur near the full moon or the new moon. If the elements of strength and timing come together, these systems are capable of resulting in moderate to major flooding in the tidal areas of New Jersey and Delaware, and up into the tidal Delaware River and its tributaries. The most significant flooding during northeasters usually occurs along the back bays of New Jersey and Delaware due to the patterns of development in those areas. While the oceanfront is somewhat protected by the beaches and dunes, there is little buffer between the back bays and the adjacent roads and structures. If an east to northeast wind occurs during multiple consecutive high tide cycles, the flooding will be exacerbated as water is not allowed to drain from the back bays at low tide.

Northeasters, even strong ones, tend to produce no more than minor flooding along the upper eastern shore of Chesapeake Bay. It is usually delayed by about 12 hours from the flooding that occurs along the oceanfront. It takes the high tide about that long to work its way up the length of the bay.

Tidal flooding may persist in a northerly wind in the wake of a departing northeaster, due in part to the contributions of Ekman transport pushing water toward the coast. You will need to wait until the wind becomes northwest to west for the water to begin to be drawn away from the coast.

Even as a northeaster pulls away from our region, it may take a few high tide cycles for flood waters to sufficiently drain out of upper Barnegat Bay (Ocean County, New Jersey). The same is true for Rehoboth Bay, Indian River Bay and Little Assawoman Bay (Sussex County, Delaware). We think that this phenomenon is due in part to the fact that all four bodies of water have only a single narrow outlet to the ocean. In the case of upper Barnegat Bay, it is Barnegat Inlet. For Rehoboth Bay and Indian River Bay, it is Indian River Inlet. Little Assawoman Bay empties into the ocean at the Ocean City Inlet in Maryland by way of Assawoman Bay and Isle of Wight Bay.

Coastal flooding is unusual when there is a northwest to west wind. There is an exception to the rule when a strong and persistent northwest to west wind occurs. The wind will have a tendency to push water from the back bays up against the bayside of the barriers islands, resulting in localized tidal flooding there.

Also, a very strong and persistent northwest to west wind may result in blow-out conditions and low water issues. You will need to wait until the west to northwest wind almost completely subsides before water begins to return back toward the coast. As a result, low water condition often linger for a low tide cycle or two beyond the cessation of the strongest northwest to west winds. The areas in our region that are most susceptible to low water issues are Raritan Bay and the Arthur Kill, the tidal Delaware River, and far upper Delaware Bay.

Winds from the southwest to southeast quadrant tend to create issues particular to Chesapeake Bay, Delaware Bay, the tidal Delaware River, the upper part of Barnegat Bay, the upper part of Rehoboth Bay and the upper part of Little Assawoman Bay.

A prolonged period of southerly winds produces our greatest threat for coastal flooding along the upper eastern shore of Chesapeake Bay. Even if the wind trends toward the southwest or southeast at some point during the event, water is not allowed to drain out of the bay. You will need to wait until the southerly wind almost completely subsides before water begins to empty from the bay.

A strong southwest to south wind usually does not cause tidal flooding in the coastal counties of New Jersey and Delaware due in part to the contributions of Ekman transport pushing water away from the coast. However, the upper parts of Barnegat Bay, Rehoboth Bay and Little Assawoman Bay are exceptions. Based on their orientation and the fact that they have only one outlet to the ocean, water can become trapped in the three bays when there is a persistent southerly wind.

A strong and persistent southeast wind may cause flooding along the coasts of Delaware and New Jersey due to the onshore component of the wind. Delaware Bay and the tidal Delaware River and its tributaries are particularly susceptible to strong and persistent southeast winds. Water is pushed up the bay and it funnels into the narrow upper bay and the river.

September 2021